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## Nebraska Earth Systems Education Network – Fall 2005

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## 2005 NATS FALL CONFERENCE SCIENCE IS RELATIVE

**October 27- 29, 2005, Camp Calvin Crest, Fremont, NE**

This year's Maiben Lecture on Thursday evening is entitled "Blast from the Past: Dinosaur Extinction by a Meteorite?" Dinosaurs fascinate us with their huge size, their great variety, and their mysterious disappearance. They ruled the land for 165 million years, so what went wrong? The accumulating evidence suggests that their demise was sudden and not pretty. Two geologists from the UNL Department of Geosciences will present the evidence for a meteorite impact 65 million years ago, on a bad day for T. rex.

David K. Watkins is a micropaleontologist (the fossils are tiny, not the paleontologist) and chair of UNL's geosciences department. Mary Anne Holmes is a geologist in the same department. They sailed with an international team of scientists on a research drilling vessel, the JOIDES Resolution, to recover some of the most complete records of that harrowing day.

Our Friday night speaker also promises to be both fun and enlightening. Dr. Robert E. Kennedy, Associate Professor of Physics at Creighton University, will present a program about Albert Einstein. Dr. Kennedy is serving his second term as chairman of Creighton University's physics department since 1993. Kennedy teaches thermodynamics, statistical mechanics, as well as courses in sound and music and Einstein. His research is in the history and philosophy of physics. He studied at Notre Dame University. Dr. Kennedy's talk will be of interest to all science teachers K-12.

-- Courtesy of the Nebraska Association of Teachers of Science Web site,  
<http://www.neacadsci.org/nats/Conferences/index.htm>

### **E-commerce Web site also allows for registration for SNR-sponsored events**

The Web site features more than 3,500 titles, including about 700 titles from the Conservation and Survey Division (the state geological survey), U.S. Geological Survey topographic maps, many other USGS maps and reprints of scholarly articles written by faculty in the school and published in refereed journals. The site, a "shopping cart" Web site for the publications, maps and other products and services of the University of Nebraska-Lincoln's SNR, is online at: <http://snr.unl.edu/products>. Extension publications by school faculty will be available from the Extension web site through a link on this site. The site accepts VISA or MasterCard.

### **K-12 Earth Science Teacher of the Year Award**

The American Association of Petroleum Geologists Foundation will present an award for K-12 Excellence in the Teaching of Natural Resources in the Earth Sciences at their 2006 annual meeting in Houston, Texas. The deadline for nomination is November 1, 2005. The award will consist of \$2,500 to the teacher's school for the winning teacher's use and \$2,500 for the teacher's personal use. The winner will also receive an all-expenses paid trip to the annual meeting. Go to: [foundation.aapg.org/tchr\\_of\\_year\\_award/index.cfm](http://foundation.aapg.org/tchr_of_year_award/index.cfm) for nomination forms and more information.

-- by Charles A. Flowerday

## GEON Summer 2006 Workshops

Geographic Educators of Nebraska (GEON) will be offering three major workshops and institutes during the summer of 2006. The primary objective of GEON is to help students realize the importance of geography in an increasingly interconnected and interdependent world. They are:

1. Sandhills Journey -- a geography and history of Nebraska's Sandhills Region. Meets new Nebraska Studies certification requirements. June 11-15, and July 8, 2006, beginning in Kearney for orientation. \$250 stipend for approved lesson plan
2. Middle East Virtual Institute (MEVI) -- June 23 through July 15 in Omaha. Most work done by computer at participants' homes. June 23 and then July 14 and 15 in Omaha. Field trip on the 14th in Omaha to visit ethnic restaurants, Muslim Religious Center, and Jewish Community Center. \$300 for approved lesson plan.
3. Mapping Technology for Nebraska , K-12 Teachers -- July 9-13, 2006, at Wayne State College. Room and board paid plus a stipend for completed lesson plan.
4. Nine other one-day workshops on Earth science and geography awareness to be announce later, to occur throughout the state from Scottsbluff to Norfolk, Lincoln and Omaha.

Contact Chuck Gildersleeve at UNO for further details, [charles\\_gildersleeve@mail.unomaha.edu](mailto:charles_gildersleeve@mail.unomaha.edu)

## Great Resources Available on the NESEN Website

The Nebraska Earth Systems Education Network website, [nesen.unl.edu](http://nesen.unl.edu), is a great resource for teachers of Earth and natural resource sciences. It includes interesting new Web sites which change weekly and announcements about awards, seminars, conferences, and other events. One great resource are the many sites dedicated to education run by the National Aeronautics and Space Administration, including the Global Change Master directory, [gcmd.nasa.gov](http://gcmd.nasa.gov), and the Earth Observatory, [earthobservatory.nasa.gov](http://earthobservatory.nasa.gov). Another great site is DLESE, the Digital Library for Earth Science Education, at: [www.dlese.org/dds/index.jsp](http://www.dlese.org/dds/index.jsp), which is part of the National Science Digital Library funded by the National Science Foundation.

Teachers can also find hundreds of Earth science lessons for elementary through high school students. The resources section is a great place to look for links to sources of scientific data, teaching tools, and more lesson plans from similar sites. The NESEN Newsletter is published quarterly and available online. Check out the projects section to see what NESEN has done in the past and what we are doing now. Don't forget the lending library with books, videos, and CDs. If you have any questions or suggestions, please email out webmaster, Monica, at [msanford2@unl.edu](mailto:msanford2@unl.edu). She can help you track down information, tools, and records.

## **Field-based Natural Resources Policy focuses on conflicts over the Platte Cedar Point provides base for close look at Platte River policy**

The School of Natural Resources (SNR) offered the first field-based version of one of its foundation courses, Natural Resources Policy. The class operated out of Cedar Point Biological Station, a field lab near Ogallala traditionally used by students in the biological sciences department. The course focused on public policy along the Platte River, an over-allocated, heavily regulated and intensively managed stream that was the laboratory. In light of pressure on its instream flows, American Rivers, a nonprofit organization that promotes river conservation, has put the Platte on its endangered list and has named it most endangered in the past.

After the field experiences, students created management plans for policy issues affecting the valley, explained Bob Kuzelka, SNR associate professor emeritus and director of the interdisciplinary Environmental Studies program at the University of Nebraska-Lincoln. They formed teams, selected problems and, near the end of the course, made a presentation that was critiqued by a panel of experts.

Platte River water is stored and diverted for irrigation, power and recreation. It also must satisfy habitat needs of fish and wildlife, including that considered critical for endangered species. Extensive groundwater pumping in the valley also may be affecting flows, so studies looked at the relationship between groundwater and surface water in the valley, Kuzelka said.

"The whole Platte Valley, but especially the middle part, is at the center of a lot of water policy debate," he noted. "This class is a pilot project in active learning. It's like a giant version of the university's water tour, but for students."

The course was designed to introduce students to the need for policies related to natural resources, the difficulties in implementing those policies and living examples of them, Kuzelka said. Other objectives were: understanding what natural resources and public policy are and how policies are made, adopted and implemented. A particular focus was their relationship to stakeholder groups invested in those policies.

After two of the three weeks of class, students voiced their enthusiasm.

"This class has opened my eyes to the policy issues in Nebraska regarding a very precious natural resource. Using the Platte River itself as a lab has really enhanced the learning experience," said Laura Tiehen, a sophomore from Omaha majoring Environmental Studies in Natural Resources. "Natural Resources Policy has helped me understand water issues on the Platte River. Growing up and working on a farm in rural Nebraska, along with studying fisheries and wildlife, has helped me to see these issues in a different way than others do. Overall, the class has been very helpful to understanding the laws and policies related to both ground- and surface water in the state," said Trevor Schmidt, a junior fisheries and wildlife major from Henderson.

### Field-based Natural Resources Policy continued

“The other attractive feature about this class is the setting,” Kuzelka said. “We’re living in cabins overlooking Lake Ogallala, which is the spillover reservoir for Lake McConaughy. The food is good, the scenery is great and there are good recreational opportunities, here at the station and over at McConaughy.” Kuzelka added.

Highlights of the field trips included a visit to the Bureau of Reclamation’s field office in Casper, Wyo., and traveling up the North Platte River to Pathfinder Reservoir, a major upstream dam in a picturesque canyon. Another involved surveying tourist use of Lake McConaughy with a research team from UNL and staff members of the state recreation area. Later, the class toured key operations of the Central Nebraska Public Power and Irrigation District, including irrigated farms, and visit the Audubon Society’s Rowe Sanctuary along the central Platte to see first hand issues of critical habitat.

“The other important point to make is that the School of Natural Resources wants to make better use of this great lab facility,” Kuzelka explained. “The SNR has other faculty teaching classes here after this policy course.”

-- by Charles A. Flowerday, editor, SNR



Platte River, Nebraska

### Youth Wildlife Education Fund

This fund supports the Wildlife Habitat Evaluation Program (WHEP). WHEP contributions come from many sources, including Pheasants Forever, profiled this issue in our “Gifts that keep giving” section. The program promotes a better understanding of rural and urban wildlife conservation and helps build life skills. Youth 8-18 years old are introduced to wildlife management concepts and issues while preparing for a statewide wildlife habitat evaluation competition.

--by Charles A. Flowerday, editor, SNR



## **Field facilities make science come alive, inspire problem solving: State-of-the-art building dedicated at Barta brothers field lab in Sand Hills**

The new building at the Barta Brothers Ranch research facility was formally dedicated June 23. A number of University of Nebraska dignitaries and ranchers representing the region spoke of its future service to the region and offered tribute to the Sand Hills ranchers who left their conservation-oriented ranch to the university.

The university hosted a public open house at the new facility and gave a field tour on the ranch, which covers about 6,000 acres in Rock and Brown counties some 20 miles south of Long Pine. Speakers emphasized the brothers' legacy of stewardship and their dedication to encouraging others to embrace this philosophy.

"We are grateful for their vision in providing this wonderful gift," Vice Chancellor for Agriculture and Natural Resources John Owens said of Clifford and James Barta. "It is a vision I know will lead to research findings and educational opportunities that someday will benefit people the Barta brothers never knew, perhaps in ways we yet can only dream of.

"There is an old adage that it is people of vision who plant saplings they will never see fully grown so that someday, those who come after them will have shade. This saying seems particularly fitting for Clifford and Jimmy Barta, from all I've heard and read about them. While I never had the privilege or experience of meeting the Barta Brothers, I understand they were excellent stewards of the land, who planted thousands of trees, created ponds and cared for wildlife, in addition to their ranching," Owens added.

The new building is a two-story, 4,800-square-foot building with living, sleeping, and research quarters for faculty, graduate students and interns. The main level features crisscross beams of local eastern red cedar in the ceiling above the living room and meeting area, which seats about 30. There is a large kitchen with doubled-up appliances for serving larger numbers and more than ample space for researchers living at the ranch and visitors. The main level features four bedrooms and four bathrooms providing living arrangements for about 12 people. Downstairs, the facility has extra lodging, lab space for on-site research, an extra living room and laundry facilities.

After the speeches and a meal served by local ranch women, a caravan of trucks and vans took visitors to several experimental plots for field demonstrations. During the field tour, a group of about 40 heard David Wedin, plant ecologist with the School of Natural Resources, talk about a major Sand Hills research effort. He is principal investigator and manager of the Sand Hills Biocomplexity Project, to which the National Science Foundation awarded a \$1.8 million grant to study the effect of climate change and moisture patterns on Sand Hills resources. The project aims to understand the effects that water, wind, and vegetation have on the stability of the Sand Hills ecosystem, he said.

## Field facilities make science come alive continued

Wedin demonstrated to the group how he could measure soil moisture down to about 10 feet using a probe snaked into a small tube in the ground that gives a percentage on its screen. Each month, the biocomplexity team measures soil moisture on 10 plots at the ranch. Wedin and his team have also disturbed about 18 acres of vegetation that covered the dunes to simulate drought conditions and better understand what role grass cover plays in the stabilization of the dunes. “The goal is to understand how the water cycle changes as the vegetation changes,” he said.

Wedin explained to the group that 800 to 900 years ago, a major drought caused a mass migration of dunes in the region and probably dwarfed the drought of the 1930s, which the Sand Hills managed to weather remarkably well. There is more grass cover and stability today than there has been for 3,000 years, he said.

Wedin said one of his main inquiries in the project was to determine what kind of drought it would take to disrupt or lay bare this landscape. He acknowledged the dichotomy between destroying a small portion of prairie grassland and the Barta brothers’ commitment to stewardship. But he assured them that he was destroying only a small part in the hopes of understanding and preserving the whole but acknowledged a public relations problem.

In his prepared comments, Sid Salzman, an Ainsworth rancher and project advisor, said he thought that Sand Hills ranchers would benefit from the experiments in the study. “As a lifetime rancher, I am looking forward to the research this facility will generate,” he said.

Earlier during the demonstrations, extension range specialist Jerry D. Volesky talked about cattle grazing systems. In the study at the ranch, cattle are frequently moved in four-pasture and eight-pasture systems around the ranch. Several small cages are put on each plot to control cattle grazing them. From these cages, the scientists measure the levels of grasses and plants. For more than six years, the team has studied the topographic positions of more than 20 plant species on the pastures. They are comparing the differences in position of various species in between, on top of, and on the north and south slopes of the dunes. The results are being shared with the U.S. Department of Agriculture’s Risk Management Agency to better understand and prepare for droughts and the effect they have on herbage production.

-- by Robert Hawkins, science journalism student, UNL; reprinted and adapted courtesy of the Custer County Chief

## **Barta Brothers made conservation ranch profitable and award-winning History behind newly dedicated NU field facility is pure Nebraska**

They lived poor and died rich.

In the winter, they would set out alfalfa pellets for the deer and antelope inhabiting their property. They created ponds and planted more than 75,000 trees in the form of windbreaks and shelterbelts, for which they won awards from the National Forestry Association and the Nebraska Tree Association. Their house is tucked away among hundreds of trees the two brothers planted. It is old and ramshackle, completely shaded from the sun, its chipped, white siding a testament to the brothers' frugality.

Clifford and James Barta "embodied the spirit of Nebraska," said Keith Miles of the University of Nebraska Foundation, because of their work ethic and commitment to the sustainability the land. Arnold, Clifford, and James Barta were born to Raymond and Vlasta Barta in the early 20th century. The family was driven to the Sand Hills by economic hardship during the Great Depression. But by the 1950s, the brothers had learned ranching from their father and according to records, the Bartas led the Omaha market in production of fat steers.

After the deaths of their parents, the ranch was passed along to the three sons, but Arnold Barta died in 1981, leaving Clifford and James to manage the land. After taking over, the brothers made lucrative investments and nearly doubled the size of the ranch, while improving the land's quality. In 1992, the brothers donated the ranch and the bulk of the estate to the University of Nebraska Foundation, making the stipulation that the land was to be used for research, education and demonstration of the use of beneficial practices. In 1996, the brothers moved into a retirement home in Verdigre, Neb. Clifford died there in 1998 and James in 2001.

The university began operating on the ranch in 1999 and has expanded the brothers' philosophy to research and conservation. "They must have been shrewd businessmen as well as great stewards of the land," said John C. Owens, the vice chancellor of the university's Institute of Agriculture and Natural Resources. Owens called the brothers "people of vision."

"What they did was something to benefit all of us," he said. The gift will "benefit people the Barta Brothers never even knew."

-- by Robert Hawkins, science journalism student, UNL, Sand Hills Biocomplexity Project; reprinted and adapted courtesy of the Custer County Chief



## UNL Group Publishes Online Weather Lessons

Weather serves as a common point of conversation in Nebraska. Nebraska experiences its fair share of thunderstorms and tornadoes, and rainfall is extremely important to the state's agricultural economy. That's why a research team at the University of Nebraska-Lincoln decided that meteorology was the ideal tool for outreach to the state's secondary-school students.

The National Science Foundation recently funded a program called "Meteorological Education and Secondary-school Outreach (MESO)". The program encourages university meteorology majors to use their knowledge as a tool for outreach to non-meteorologists.

As a part of this program, two online lessons, "Thunderstorms" and "Weather Systems" were created during summer 2005 by three UNL undergraduate meteorology majors: Kyle Klute, Carrie Setlak, and Natalie Umphlett.

The web-based lessons are now available and fully operational. The lessons are available to anyone with an internet connection, and be accessed at the web address <http://www.meso.unl.edu>. The lessons include multiple chapters' worth of audio, text, and animated demonstrations about interesting local weather phenomena.

MESO is directed by Dr. Matthew D. Parker, of UNL (2002-2005) and North Carolina State University (2005-present). The goals of this program are to help secondary-school students undertake scientific thinking while learning useful information about local weather, and to advance the scientific understanding, communication, and computing skills of the undergraduate students who participate.

Teachers, students, and other interested readers can obtain more information about MESO from the program's website, [www.meso.unl.edu](http://www.meso.unl.edu). Also contact Matthew D. Parker at 919-513-4367 or [parker@updraft.unl.edu](mailto:parker@updraft.unl.edu) or [mdparker@ncsu.edu](mailto:mdparker@ncsu.edu)

--Dr. Matthew D. Parker, Director, Meteorological Education and Scondary-school Outreach